Objective

Describe and compare the ‘standard’ phases of choroidal indocyanine green angiography with the standard phases of retinal fluorescein angiography in a variety of disease states.

Methods

The fundus camera-based digital angiograms of 27 consecutive patients who underwent concurrent fluorescein angiography (FA) and indocyanine green angiography (ICGA) were reviewed and evaluated by two retina specialists and one ophthalmic photographer. Normal filling phases and hypofluorescence were identified and compared in each angiogram.

Recent literature describing ICG angiography was reviewed.1-7

Results

The normal course of FA includes these phases:
- choroidal filling (E)
- choroidal venous filling (D)
- late choroidal recirculation (C)
- choroidal arterial and venous filling phases (B)
- choroidal arterial filling phase (A)

The normal course of ICGA includes these phases:
- choroidal arterial filling (G)
- choroidal venous filling (F)
- choroidal arterial and venous filling phases (E)
- choroidal arterial filling phase (D)
- choroidal arterial filling phase (C)
- choroidal venous filling (B)
- choroidal arterial filling phase (A)

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- choroidal arterial and venous filling phases (B)
- choroidal arterial filling phase (A)

The normal course of ICGA includes these phases:
- choroidal arterial filling (G)
- choroidal venous filling (F)
- choroidal arterial and venous filling phases (E)
- choroidal arterial filling phase (D)
- choroidal arterial filling phase (C)
- choroidal venous filling (B)
- choroidal arterial filling phase (A)

Similarities: normal FA & ICGA filling phases
- choroidal venous filling (D)
- choroidal arterial filling phases (B)
- choroidal arterial filling phase (A)

Differences: normal FA & ICGA filling phases
- choroidal arterial and venous filling phases can be distinguished in ICG (G)
- choroidal venous filling (D)
- choroidal arterial filling phases (B)
- choroidal arterial filling phase (A)

The accurate interpretation of clinically relevant characteristics in FA and ICGA requires recognition of the fundamental fluid dynamics and the biophysical properties of these two dyes (clinical cases #1, #2).

The normal phases of FA are characterized by the hemodynamics of fluorescein dye movement through the retinal vasculature, with minimal contribution by rapidly dissipating dye in the choroidal vasculature.

Normal phases of ICGA are characterized by the hemodynamics of ICG dye movement through the retinal vessels, the choroidal and choriocapillaris vascular beds, and the prominent retention of the ICG dye within the choroidal vasculature.

Conclusions

- Vessel filling in both the choroidal and retinal circulations can be identified on ICGA, while the normal phases of FA describe retinal filling patterns only.
- Normal and abnormal hypofluorescence angiographic patterns familiar to retina specialists during the interpretation of FA differ from the hypofluorescent pattern found during ICGA.
- Heightened recognition of the spectrum of normal ICGA characteristics during interpretation is encouraged.

References